Leica DM500, DM500 B
Manual

Leica
MICROSYSTEMS

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Safety regulations

Safety concept

The individual modules of the Leica DM microscopy series include an interactive CD-ROM with all relevant user manuals several languages. Keep it in a safe place, and readily accessible to the user. User manuals and updates are also available for you to download and print from our web site at
www.leica-microsystems.com.

This operating manual describes the special functions of the individual modules of the Leica DM microscopy series and contains important instructions for their operational safety, maintenance, and accessories.

The "Safety concept" booklet contains additional safety information regarding the service work, requirements and the handling of microscope, accessories and electrical accessories as well as general safety instructions.

You can combine individual system articles with articles from external suppliers. Please read the user manual and the safety requirements of the supplier.

Before installing, operating or using the instruments, read the user manuals listed above. In particular, please observe all safety instructions.

To maintain the unit in its original condition and to ensure safe operation, the user must follow the instructions and warnings contained in these user manuals.

Symbols used in this operating manual

Warning of a danger

This symbol indicates especially important information that must be read and complied with.

Failure to comply can cause the following:

- Hazards to personnel
- Functional disturbances or damaged instruments

Warning of hazardous electrical voltage

This symbol indicates especially important information that is mandatory to read and observe.

Failure to comply can cause the following:

- Hazards to personnel
- Functional disturbances or damaged instruments

Danger due to hot surface.

This symbol warns against touching accessible hot surfaces, e.g. those of light bulbs.

For Model DM500 B (Battery Version)

Dispose of old batteries and defective appliances in accordance with the statutory regulations.

Important information

This symbol indicates additional information or explanations that intend to provide clarity.

Explanatory notes

- This symbol within the text points to additional information and explanations.

Important Notes

Description

The Leica DM500 and DM500 B microscope meets today's state of the art of technology. Nevertheless, hazards may still arise during operation. The potential risks are described below.

Before installing, operating or using the instruments, it is required to read this user manual. In particular, please observe all safety instructions.

Contact address

Leica Microsystems (Switzerland) Ltd.
Industry Division
Max Schmidheiny Strasse 201
CH-9435 Heerbrugg (Switzerland)

User Manual

This user manual includes important instructions related to operating safety, maintenance and accessories,

Your Leica DM500 or DM500 B microscope comes with an interactive CD-ROM with all relevant user manuals. Keep it in a safe place, and readily accessible to the user. User manuals and updates are also available for you to download and print from our web site at www.leica-microsystems.com

Accessories from third-party suppliers

You can combine individual system articles with articles from external suppliers. Please read the user manual and the safety requirements of the supplier.

Original condition

To maintain the unit in its original condition and to ensure safe operation, the user must follow the instructions and warnings contained in these user manuals.

Legal requirements

Adhere to general and local regulations relating to accident prevention and environmental protection.

EC Declaration of Conformity

Electrically operated accessories are constructed based on the state of the art of technology and are provided with an EC Declaration of Conformity.

Instructions on use

Intended use

The Leica DM500 and DM500 B microscopes are optical instrument which use magnification and illumination to improve the visibility of objects. It is used for observing and documenting.

The Leica DM500 and DM500 B microscopes may be used only in closed rooms and must be placed on a solid floor.

The Leica DM500 or DM500 B microscopes can be used in clean rooms without any problems.

Position the Leica DM500 or DM500 B microscope so that it can be disconnected from the power supply at any time. The power cord must remain accessible at all times, because the power supply is foreseen as mains disconnecting device.

Place of use

Only use the instruments in closed, dust free rooms and between +10 °C and +40 °C. Protect the devices from oil, chemicals and extreme humidity. If using the devices outdoors, protect them from dust and moisture. Never use electrical devices outdoors. Install electrical devices at least 10 cm from the wall and away from flammable substances.

Avoid large temperature fluctuations, direct sunlight and vibrations. These conditions can distort measurements and micrographic images.

In warm and warm-damp climatic zones, the individual components require special care in order to prevent the build-up of fungus.

Non-intended use

Using the instrument in any way contrary to the specifications in the user manual can lead to bodily harm and damage to objects. Doing so can impair the functions of the protective measures provided.

Never install any other plug (NEMA 5-15P) or unscrew any mechanical components unless expressly instructed to do so in the instructions.

CAUTION: Risk of explosion if battery is replaced by an incorrect type. Dispose of used batteries according to the instructions.

The devices and accessories described in this operating manual have been tested for safety and potential hazards.

Instructions on use (continued)

The responsible Leica affiliate must be consulted whenever the instrument is altered, modified or used in conjunction with non-Leica components that are outside of the scope of this manual.

Unauthorized alterations to the device or noncompliant use shall void all rights to any warranty claims.

Transport

If at all possible, use the original packaging for shipping or transporting individual modules.

In order to prevent damage from vibrations, disassemble all moving parts that (according to the user manual) can be assembled and disassembled by the customer and pack them separately.

Disposal

Disposal must comply with locally applicable laws and regulations.

Integration in third-party products

When installing Leica products into third-party products, the manufacturer of the complete system or its dealer is responsible for following all applicable safety instructions, laws and guidelines.

Health risks and dangers of use

Health risks

Workplaces with microscopes facilitate and improve the viewing task, but they also impose high demands on the eyes and holding muscles of the user. Depending on the duration of uninterrupted work, asthenopia and musculoskeletal problems may occur. For this reason, appropriate measures for reduction of the workload must be taken:

- Optimum workplace layout
- Frequent changes of activity
- Thorough training of the personnel, giving consideration to ergonomic and organizational aspects

The ergonomic design and construction of the Leica microscopy series are intended to reduce the exertion of the user to a minimum.

Danger of infection

Direct contact with eyepieces is a potential transmission method for viral infections of the eye.

The risk can be kept to a minimum by using personal eyepieces for each individual or detachable eyecups.

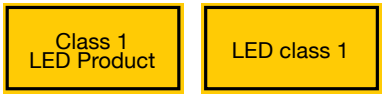
Dangers during use

- The Leica DM500 or DM500 B microscope may only be connected to a grounded socket.
- The Leica DM500 or DM500 B microscope may not be operated unless it is in proper functioning condition.

LED Klasse 1 /Class 1 LED Product

The illumination meets laser class 1 requirements in accordance with IEC 60825-1 "Safety of LED products".

Caution: Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure!



Information for the person responsible for the instrument

Information for the person responsible for the instrument

- Ensure that the Leica DM500 or DM500 B microscope is used only by qualified personnel.
- Ensure that this user manual is always available at the Leica DM500 or DM500 B microscope.
- Carry out regular inspections to make certain that the authorized users are adhering to safety requirements.
- When instructing new users, do so thoroughly and explain the meanings of the warning signs and messages.
- Assign individual responsibilities for starting, operating and servicing the instrument and monitor the observance of these responsibilities.
- Do not use the Leica DM500 or DM500 B microscope unless it is in perfect condition.
- Inform your Leica representative or Leica Microsystems (Schweiz) AG, Industry Division, 9435 Heerbrugg, Switzerland, immediately of any product defect that could potentially cause injury or harm.
- If you use accessories made by third-party manufacturers with the Leica DM500 or DM500 B microscope, be sure that each such manufacturer confirms that the combination is safe to use and observe the product's user manual.
- Modifications and maintenance of the Leica DM500 or DM500 B microscope may only be performed by professionals expressly authorized by Leica.
- Only original Leica replacement parts may be used in servicing the product.
- After service work or technical modifications, the unit must be reconfigured with observance to our technical requirements.
- If the unit is modified or serviced by unauthorized persons, is improperly maintained (as long as maintenance was not carried out by us), or is handled improperly, Leica will not accept any liability.
- The electric installation in the building must conform to the national standard, e.g. current-operated ground leakage protection (fault-current protection) is suggested.

Care instructions

General instructions

- Protect the Leica DM500 or DM500 B microscope against damp, vapors, acids, alkalis, and corrosive substances. Do not store chemicals in the vicinity.
- Protect the Leica DM500 or DM500 B microscope from oil and grease. Never grease or oil mechanical parts or sliding surfaces.
- Follow the instructions of the disinfectant manufacturer.
- It is advisable to enter a service agreement with Leica Service.

Cleaning coated parts and plastic parts

- Dust and dirt particles should be removed with a soft brush or lint-free cotton cloth.
- Remove coarse debris with a moistened disposable cloth.
- Clinging dirt can be removed using petroleum ether or alcohol
- Acetone, xylene or nitro-containing thinners must NOT be used.
- Never use chemicals to clean colored surfaces or accessories with rubberized parts. This could damage the surfaces, and specimens could be contaminated by abraded particles.

Cleaning glass surfaces

- Remove dust using a fine, dry and grease-free brush made from hair, by blowing with a squeeze blower, or by using a vacuum.
- Remove dirt using a clean cloth that has been moistened with distilled water.
- Remove tough dirt using alcohol, chloroform or petroleum ether.

Accessories, maintenance and repair

Accessories

Only the following accessories may be used with the Leica DM500 or DM500 B microscope:

- The Leica accessories described in this user manual.
- Other accessories, provided that these have been expressly approved by Leica as being technically safe in this context.

Maintenance

- The Leica DM500 and DM500 B microscopes are basically maintenance-free. To ensure that they always operate safely and reliably, we recommend that you take the precaution of contacting the responsible service organization.

You can arrange for periodic inspections or, if appropriate, conclude a maintenance contract with them.

- It is advisable to enter a service agreement with Leica Service.
- For maintenance and repair, only OEM spare parts may be used.

Repairs and service work

- Only original Leica Microsystems spare parts may be used.
- Before opening the instruments, switch off the power and unplug the power cable.
- Avoid contact with powered electrical circuits, which can lead to injury.

Service address

In case of problems, please contact us as follows:

Leica Microsystems (Switzerland) Ltd.
Industry Division
Max Schmidheiny Strasse 201
CH-9435 Heerbrugg (Switzerland)
Phone +41 71 726 33 28

Electrical data and ambient conditions

Fuse Replacement

Unplug the instrument before changing any fuses. The Leica DM500 has two fuses, which are located behind the power cord receptacle.

Use only fuse type: 5×20 mm, 1 Amp/250V, Quick acting (# 13RFAG30003)

Electrical data

DM500	Input: 100-240 VAC, 50/60 Hz, 5 W (3 W LED)
DM500 B	Input: 100-240 VAC, 50/60 Hz, 0.5-0.2 A OR 4× 1.2 V AA rechargeable batteries

Use only 1.2 Volt NiMH type AA rechargeable batteries with a maximum of 2700 mAh. Do not use non-rechargeable AA batteries.

Environment

Temperature for use	+10 °C … +40 °C
Storage temperature	-20 °C … +52 °C +50 °F … +104 °F
Manipulation shock	25 mm on 50 mm hard wood
Transport shock (unpacked)	100 g / 6 ms
Transport shock (packed)	800 mm free fall
Transport vibrations (unpacked)	5–200 Hz / 1.5 g
Atmospheric pressure "in use" and for storage:	500–1060 mBar
Humidity “in use” and for storage:	20–90%
Installation Category II (Overvoltage Category)	
Pollution degree 2	

The Leica DM500, DM500 B

Congratulations!

Thank you for purchasing the Leica DM500 or DM500 B Compound Microscope from Leica Microsystems. This model's exclusive design features and full range of accessories make it a truly versatile, high-quality instrument for educational and routine clinical applications.

Unpacking

- Carefully remove the microscope and any components from the packing carton.
- Check the components against the planned configuration.
- Optional items such as contrast accessories, camera adapters, cameras, and carrying cases are not shipped as part of the standard equipment. These items are delivered in separate packages.
- Please do not discard any of the packing materials. They should be used for safely storing and transporting the instrument should the need arise.

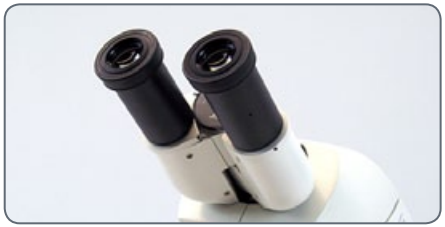
Get Ready!

Attaching the viewing Tubes

Tools used

- Allen key

There are two types of viewing tube. Identify which viewing tube you have:



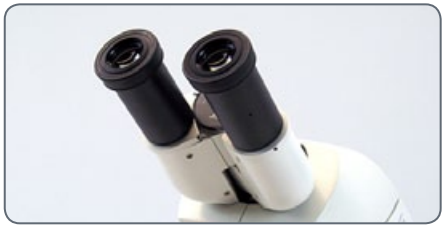
Type 1: Leica EZ viewing tube with integrated eyepieces.

Type 2: Standard viewing tube with separate eyepieces

1. Slightly unscrew the set screw (located on top of the stand) with the Allen key tool provided.

2. Insert the dovetail into the stand support and tighten the set screw firmly without forcing it. This precisely positions the viewing tube onto the optical axis of the microscope, regardless of the selected rotation.

Leica EZ Viewing Tube – integrated eyepieces

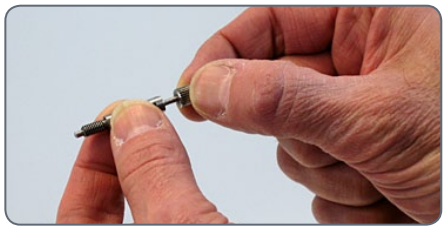


Leica EZ viewing tube with integrated eyepieces.

To rotate the Leica EZ viewing tube, either loosen the set screw on the stand or replace the set screw with the (optional) captive thumbscrew.

1. To use the captive thumbscrew, completely remove the set screw that comes with the stand.

Be sure the thumbscrew portion of the captive thumbscrew is fully loosened before attaching it to the stand:



2. Position the Leica EZ viewing tube back in place on the stand.

3. Attach the captive thumbscrew using the wrench tool that comes with the captive thumbscrew.

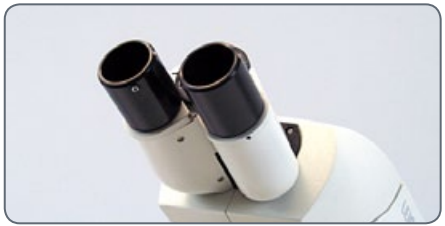
Leica EZ Viewing Tube – integrated eyepieces (cont.)

You can now safely rotate the Leica EZ viewing tube by loosening the captive thumbscrew, rotating the viewing tube, and tightening the captive thumbscrew again.

The eyepieces are already integrated with the Leica EZ viewing tube and are pre-adjusted for corrected vision; therefore no eyepiece adjustment or insertion is necessary.

Go on to the section "Eyeguards" on page 23.

Leica Standard Viewing Tube – separated eyepieces



Standard viewing tube; eyetubes do not yet contain the eyepieces

The standard viewing tube has a rotatable dovetail. Therefore, you can now rotate the standard viewing tube freely in any orientation.

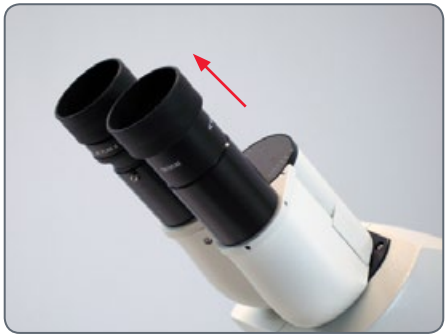
1. Insert the eyepieces into the eyetubes.

2. Lock the eyepieces into the eyetubes by tightening the silver screws on the underside of the eyetubes with a standard Cross type (Phillips) screwdriver (not provided).

The eyepieces will still rotate, but they will be captive in the eyetubes.

Eyeguards

If you wear eyeglasses for microscope viewing, keep the rubber eyeguards folded down. If you do not wear eyeglasses, you may find it useful to unfold the rubber eyeguards in order to help block out ambient room light.



If you have purchased a standard microscope configuration, you will notice that the objectives are already installed on the nosepiece, and the substage condenser is already installed on the stand. In this case, go to section "Operation" on page 26. If you purchased your Leica DM500 or DM500 B by components and not by standard configuration, please continue to section "Installing Objectives" on page 24.

Installing Objectives and Substage Condenser

Installing Objectives

Always rotate the nosepiece by using the knurled nosepiece ring.

1. As you rotate the nosepiece clockwise, attach the objectives by screwing them into the nosepiece holes starting with the lowest magnification and advancing to the highest magnification.

Substage Condenser

The Leica DM500's and DM500 B's substage condenser is pre-installed, pre-focused, and pre-centered. No additional installation or alignment is required.

Get Set!

Turning on the microscope

As a safety precaution, the power cord has been grounded to the microscope base. Never use an adapter between the power cord and the power source; it will render the grounding feature ineffective.

Work Surface

Always use your microscope on a hard, stable surface.

Power Cord

If the power cord is not already attached, attach it securely to the back of the microscop.

If you have a DM500 B with a rechargeable base:

1. Insert the batteries in the underside of the base

2. If the power cord is not already attached, attach it securely to the power supply, if you use a DM500 B with a rechargeable base.

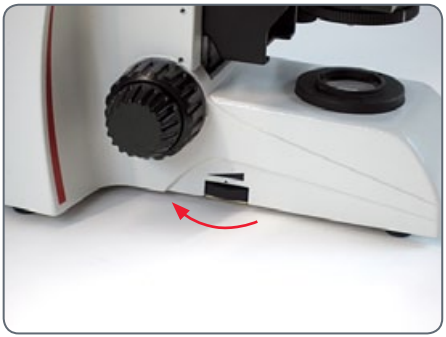
3. Plug in the power supply or the optional solar panel in order to charge the batteries (allow 4 hours minimum to fully charge the batteries)

After being fully charged the batteries will provide 6-8 hours of operation.

If necessary, the microscope can function without batteries assuming either the power supply or optional solar panel is plugged in.

Setting the Illumination Intensity

Set the illumination control knob (located on the bottom left of the microscope stand) to the lowest setting to start. The illumination control knob allows you to adjust the intensity of light produced by the illumination system.



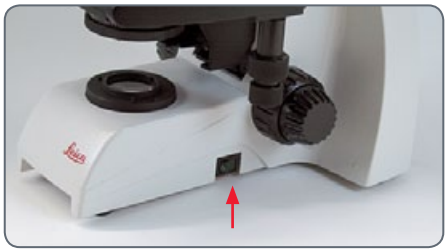
Using the Condenser

Plug in and Turn on the Microscope

1. Plug the microscope power cord into a suitable grounded electrical outlet.

A grounded 3-wire cord is provided.

2. Turn the microscope on using the switch on the bottom right-hand side of the microscope stand.

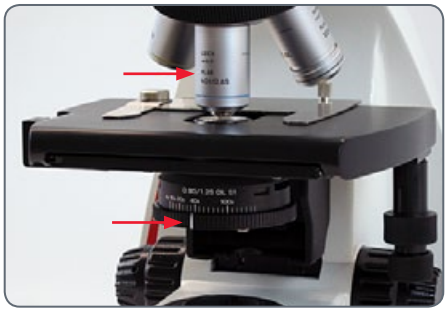


On/Off switch is located on the bottom right hand side of the stand

Using the Condenser

The condenser is furnished with an iris diaphragm, which can be adjusted to match the effective numerical aperture of each objective.

1. To open and close the iris diaphragm, simply rotate the knurled condenser ring to the right or to the left so that the line on the rotating ring aligns with the objective magnification in use.

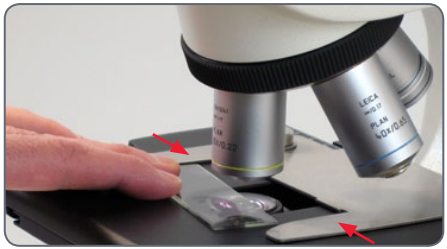


2. To start, fully open the iris diaphragm of the aperture condenser by rotating the condenser ring to the extreme right.

Prepare to View a Specimen Slide

Prepare to View a Specimen Slide

1. Place a specimen slide on the stage by sliding the specimen slide forward into the slide grips.
2. Use the X/Y stage control to position the slide so a portion of the specimen is under the objective in use.



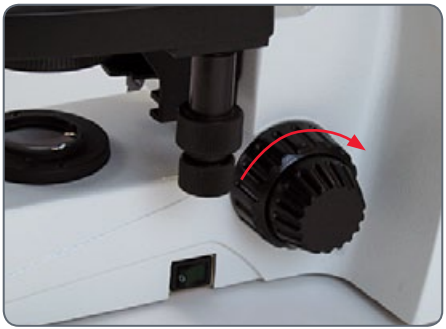
Slide grips hold the slide in place.

Focusing

Focusing

1. Rotate the nosepiece (using the knurled nosepiece ring) to move the lowest magnification objective into working position.

2. Raise the stage by rotating the coarse adjustment knob to its positive stop at the highest position.

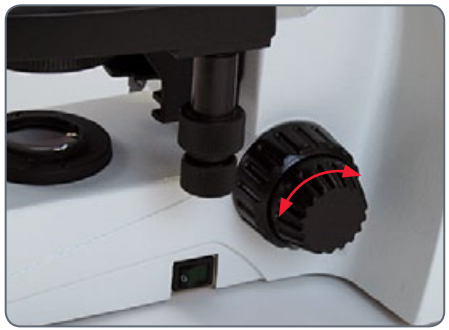


Coarse adjustment knob

3. Look into the eyepieces and adjust the illumination intensity so that it is comfortable for viewing.

The Leica DM500 or DM500 B microscope stand has been factory-adjusted so that the stage focus can be found within 1.5 rotations of the fine focus adjustment from this position.

4. Using the fine adjustment knob, bring the specimen into sharp focus.



Fine adjustment knob

Viewing Tube Adjustment

1. Adjust the eyetubes for your interpupillary distance. Fold or unfold the eyetubes to decrease or increase the distance between the eyepieces until you see one illuminated circle.

The viewing tubes maintain a constant tube length for all interpupillary settings. This means that a change of interpupillary distance does not affect parfocality, magnification, or calibrations that depend on magnification.

Leica EZ Viewing Tube

If you are using a Leica EZ viewing tube, which already has the eyepieces integrated with the eyetubes, there are no additional adjustments necessary. Be sure you are wearing your eyeglasses or contact lenses. Go on to section "Oil Immersion" on page 32.

Standard Viewing Tube with Two Fixed Eyepieces

If you are using a standard viewing tube with two fixed eyepieces (no focusing eyepieces), there are no additional adjustments necessary. Be sure you are wearing your eyeglasses or contact lenses. Go on to section "Oil Immersion" on page 32.

Standard Tube with One or Two Focusing Eyepieces

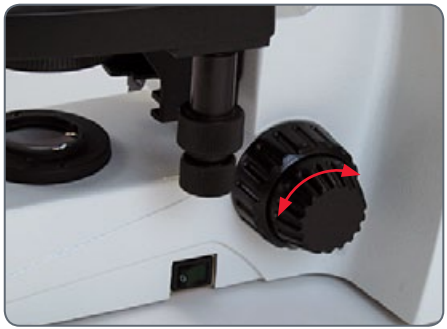
If you are using a standard viewing tube with one or two focusing eyepieces, you need to make some adjustments:

1. Set the focusing eyepieces to the "0" diopter setting.

Viewing Tube Adjustment (cont.)

If you are comfortable wearing your corrective lenses (contact lenses or eyeglasses) for microscope viewing, leave them on and your adjustments will be minimal.

2. Focus on the specimen using the fine adjustment knob of the microscope while looking only through one of the eyepieces (if you have one focusable and one non-focusable eyepiece, look through the non-focusable eyepiece at this time). To help focus, cover or close the other eye.



3. Now switch to look only through the other eyepiece (focusing eyepiece) with your other eye. This time, focus the specimen by using the focusing capability in the focusing eyepiece.

Do not raise or lower the stage to focus.

4. Grip the knurl on the focusing eyepiece with one hand and rotate the top of the eyepiece with the other hand until the specimen is in focus with this eye and this focusing eyepiece. This corrects for any vision differences between your right eye and left eye.

5. Now switch to a high magnification objective (not an oil objective) and focus the microscope while viewing with both eyes.

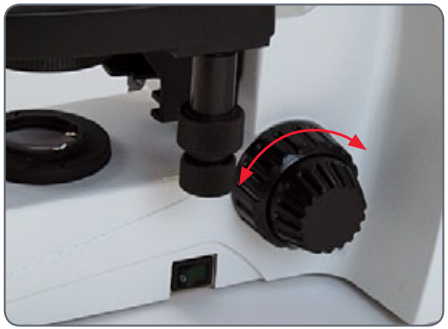
The higher magnifications have a shallower depth of field. Therefore, after focusing with a high magnification, you will find that when you change to lower magnifications, you only have to adjust the fine focus slightly, if at all.

Oil Immersion Technique

Oil Immersion Technique

1. Find the field of view on the slide that you would like to inspect.

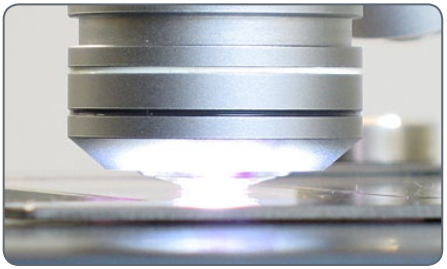
2. Lower the stage to its lowest position using the coarse focus knob.



3. Place a drop of Leica Immersion Oil on the specimen slide on the area of the specimen that you were inspecting.

4. Swing the oil immersion objective in place (the objective will be labeled "OIL")

5. Raise the stage slowly using the coarse focus knob until the drop of oil on the specimen slide just comes in contact with the front of the oil immersion objective lens.



6. Grip the knurled nosepiece ring and rock the objective back and forth to eliminate any air bubbles, then settle the oil objective into position with the oil between the front lens of the objective and the specimen slide.

Oil Immersion Technique (cont.)

7. Look through the microscope and slowly rotate the fine focus knob to raise the stage until the specimen is in focus.

8. When finished using the oil immersion objective, be sure to clean the front of the objective, the specimen slide, and any other surfaces that the oil contacted using the instructions in section "Care of the Microscope" on page 37.

Go!

Ready! Set! Go!

Now all you need to do is change objectives, set the condenser appropriately for the objective magnification in use, and enjoy the view!

Care of the Microscope

General maintenance

General

Always carry the microscope using two hands. There is a handle on the back of the microscope and an undercut in the front for this purpose.

- The cord wrap allows you to wrap the cord in such a way that only the length you need is extended.

- Keep all optical components clean. Cleanliness is important for maintaining good optical performance.
- The microscope should always be covered with the plastic dust cover (provided with the instrument) when it is not in use.
- If any optical surface becomes coated with dust or dirt, clean the surface by blowing it off with a syringe or brushing it off with a camel hair brush before attempting to wipe the surface clean.
- Optical surfaces should be cleaned with a lint-free cloth, lens tissue or a cotton swab moistened with methanol or a commercially available glass cleaner. Do not use alcohol.
- It is very important to avoid the excessive use of solvents, so use them sparingly. The lint-free cloth, lens tissue or cotton swab should be moistened with solvent, but not be wet enough for the solvent to seep around the lens.

General maintenance (cont.)

- No part of the microscope is quite so vulnerable to collecting dirt, dust, and oil as the front lens of the objective. Whenever you encounter lack of contrast, cloudiness or poor definition, carefully check the condition of the front lens with a magnifier.

- The lower magnification objectives have fairly large front lenses and can be cleaned with a cloth or lens tissue wrapped around a finger and moistened with methanol.

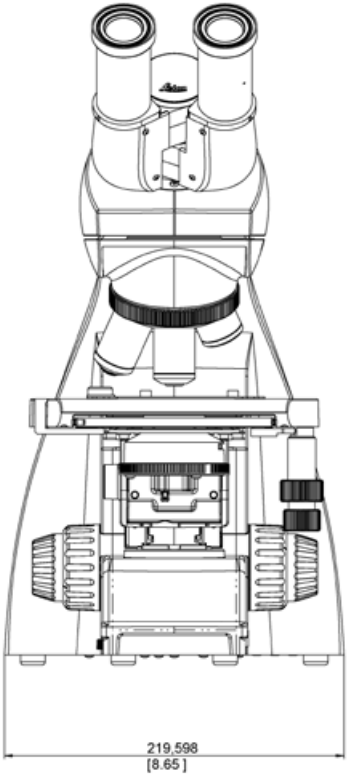
- Cleaning 40× and 100× objectives requires more care. Note: To achieve the high degree of flatness obtained with higher magnification objectives, the objective has a small concave front lens of fairly short radius or curvature. The surface of this front lens can be readily cleaned with a toothpick covered with a cotton tip, or with a small cotton swab. Moisten the cotton with methanol and squeeze it almost dry (do not use alcohol). Wipe the front lens lightly without applying undue force or scrubbing action. Make sure that the cotton tip contacts the concave lens surface. Check the objective with a magnifier after cleaning.

- If you need to remove the microscope's viewing body, be careful not to accidentally touch the outer lens surface (located on the underside of the body). Fingerprints on this surface will reduce image clarity. This lens can be cleaned in the same manner as objectives and eyepieces.

Illumination

- The Leica DM500 and DM500 B uses LED illumination. Therefore, no lamp changing is required for the life of the microscope.

Dimensions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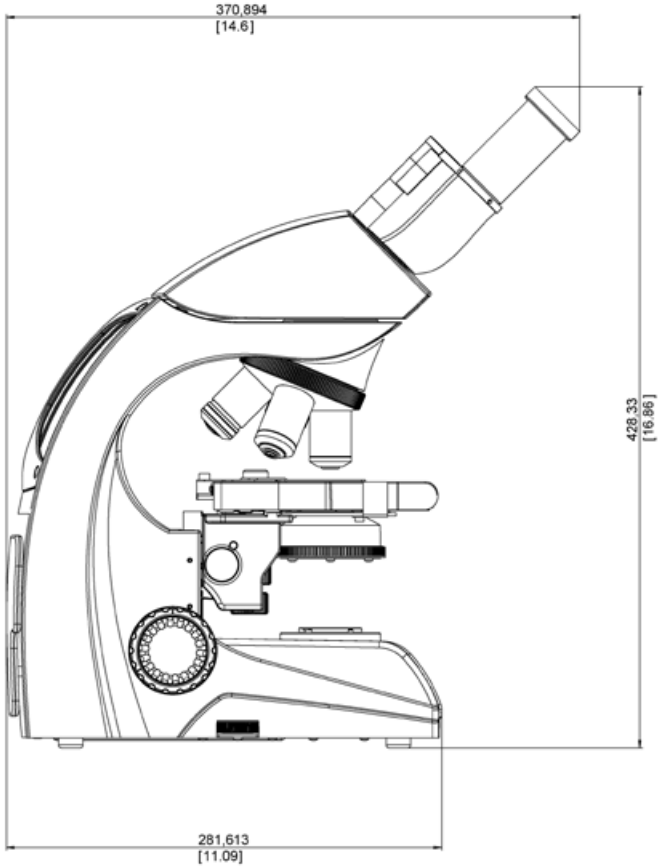
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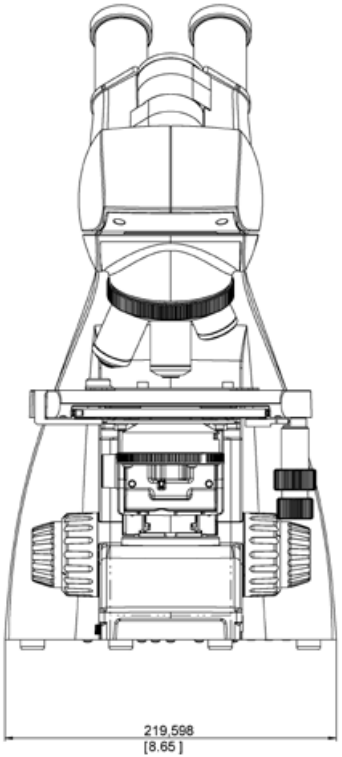
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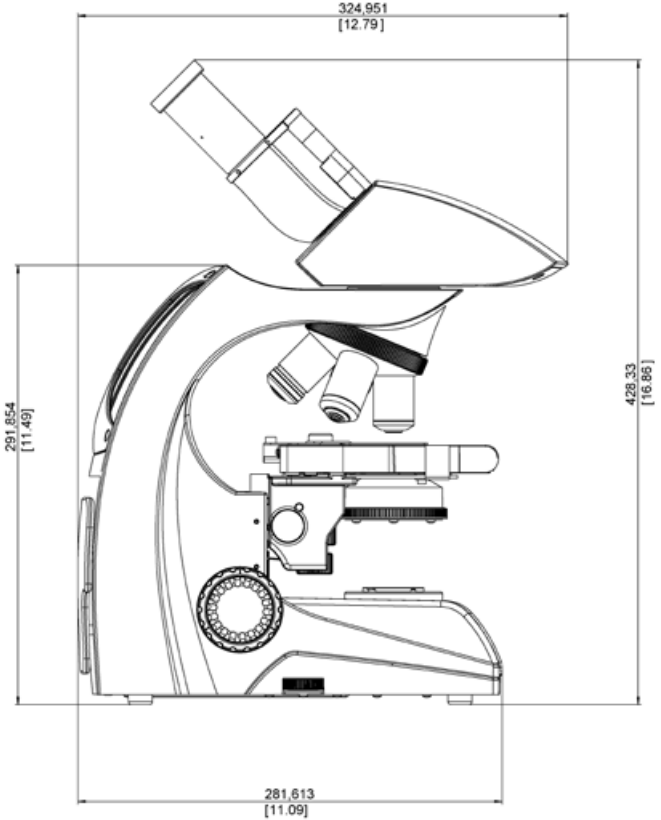
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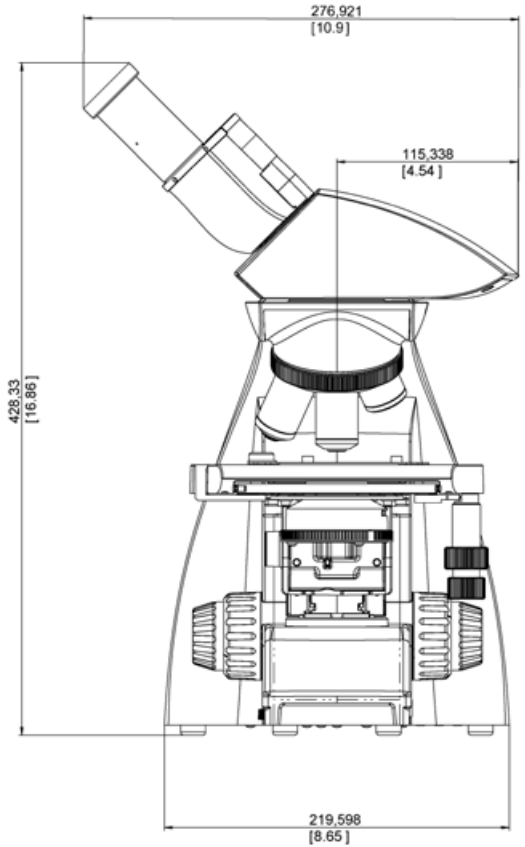
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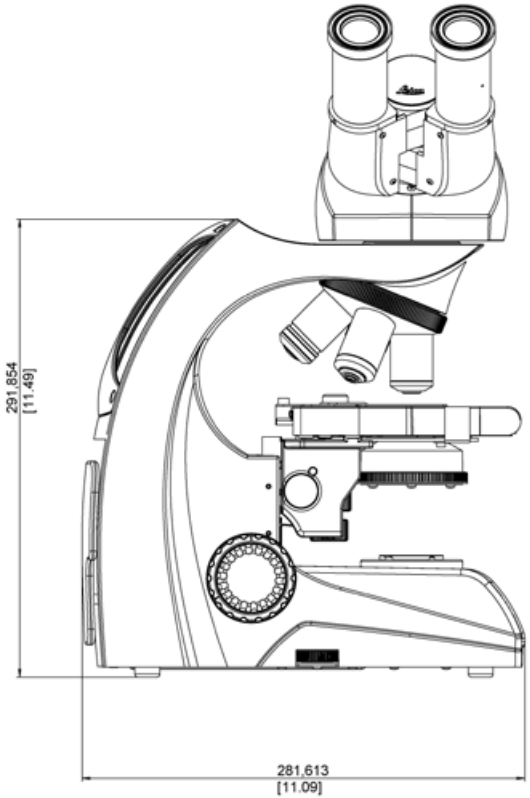
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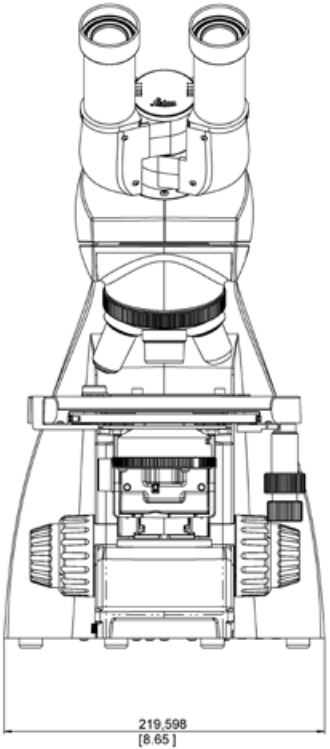
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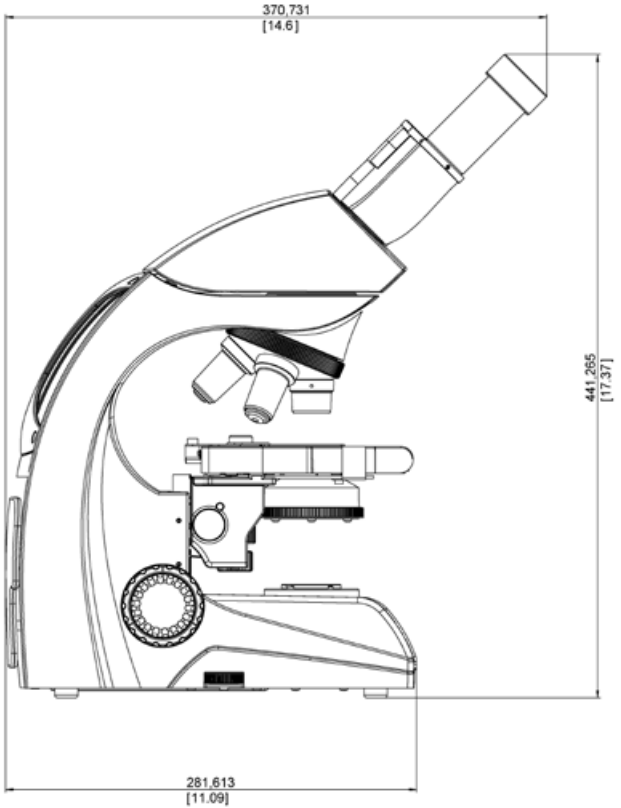
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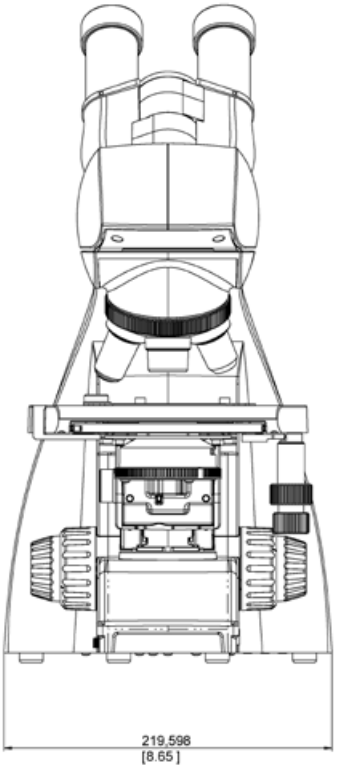
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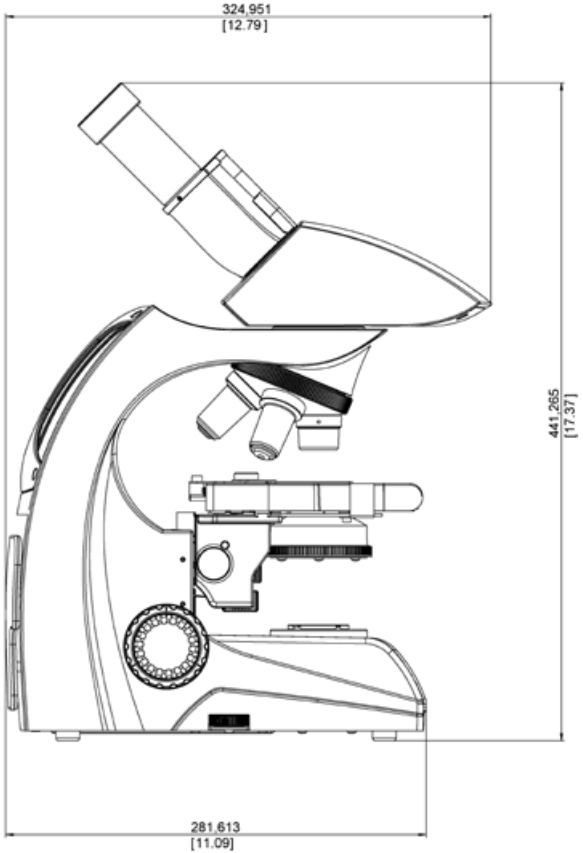
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